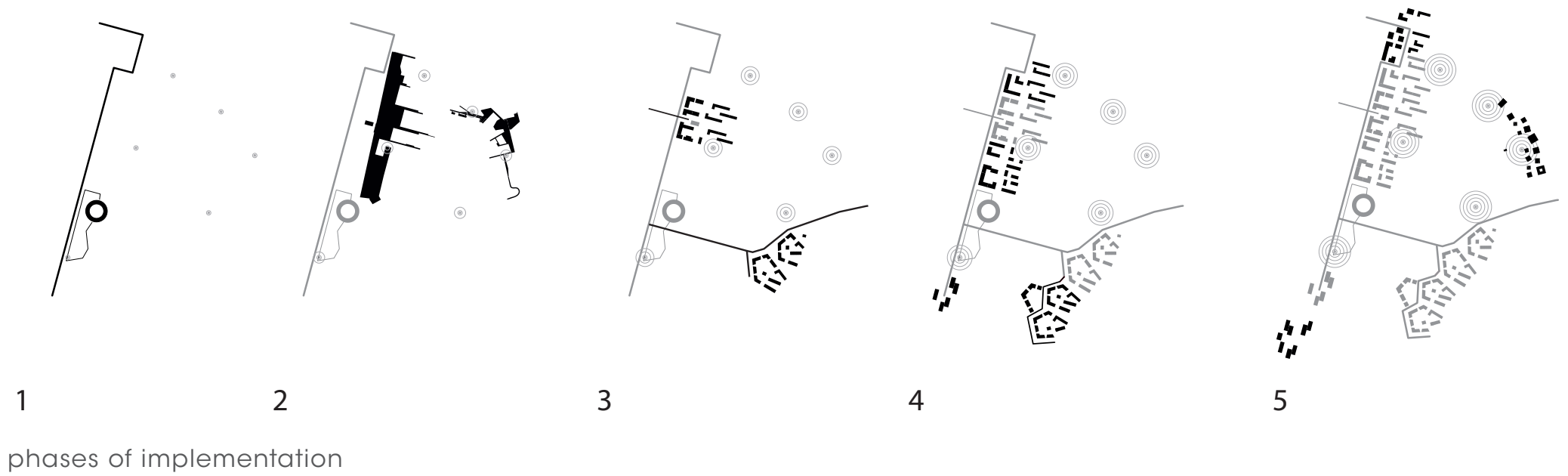




ROUND HERE 5309



Satamalahti, Mikkeli Architecture ideas competition for the area of Samalahti, stage 2

The area of Satamalahti, and the potentials for future sustainable city developments is unique, not only nationally but also in an international comparison. The mere presence of water from all sides, and the direct connection to the beautiful surrounding nature offers multiple living qualities rare to most developments.

The experience of the water is rich, enhancing the sensitivity to climate, changing with the season from the white summer nights to the frozen winter days, all with changing possibilities for recreational and contemplative activities, from swimming, sailing and rowing, to skating, ice sailing, fishing and ice building.

The waterfront experience can, with careful planning, be inclusive and open for everybody, as opposed to the exclusivity and seclusion experienced many places around the world in settlements with a unique site.

Satamalahti area should have its own identity as a generous open watercity, that ensures public access to the water everywhere, letting as many as possible have the daily luxurious benefit from living, working, and recreating by the water.

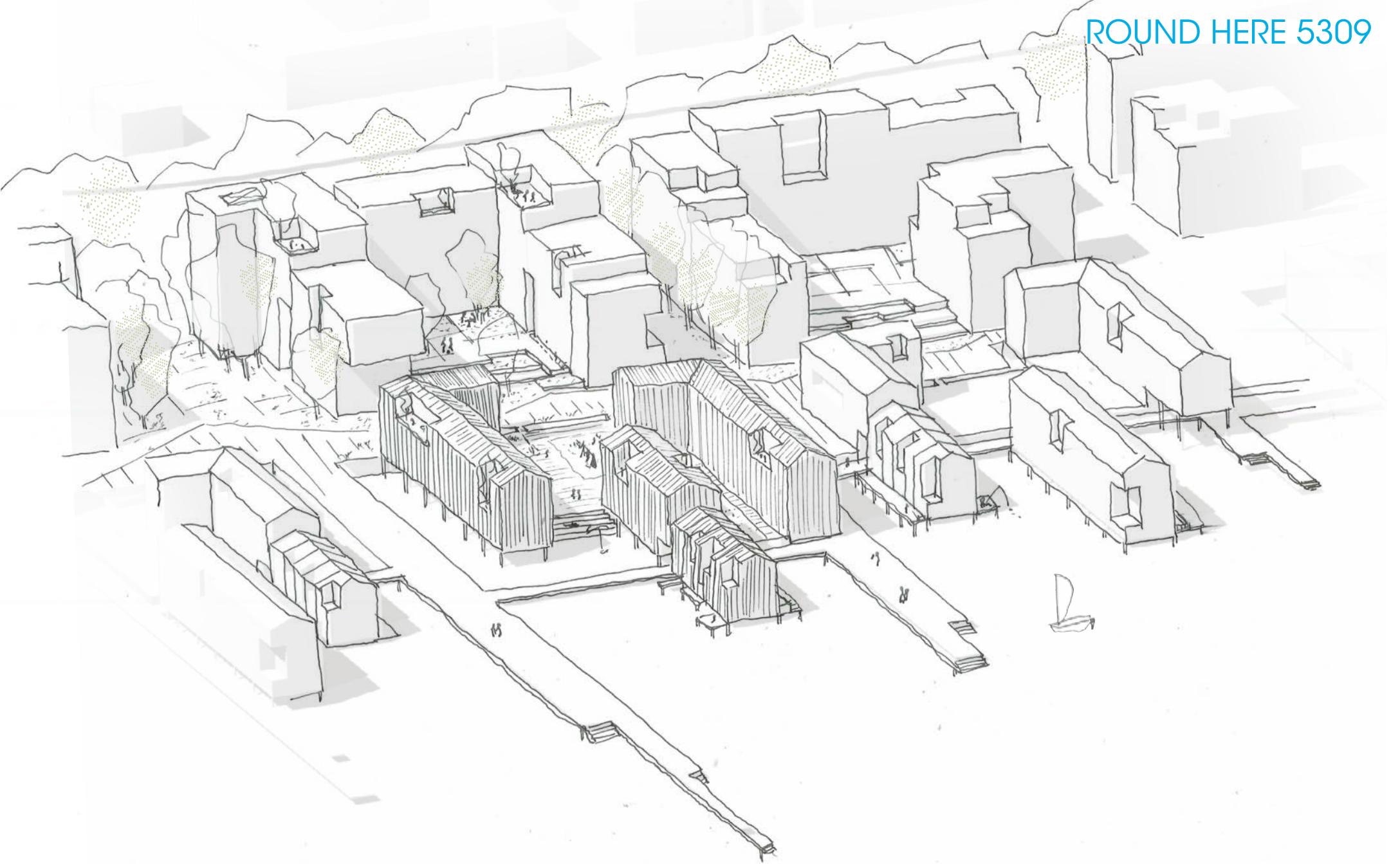
The dense and varied cityscape, that prioritises people, and human activity over parking lots and motorized traffic, ensures a lively and safe streetlife, even in the cold wintermonths.

A city experience that includes natural elements, and is carefully planned to take crucial knowledge of human

behavior, sun orientation, shelter from wind, scale and distance in the public space, enhance moving, staying and meeting in the streetscape.

A multiplicity of different housing, types, sizes, and finance models, ensures that there will be possibilities for everyone, from the large family to the single elderly, from the wealthy to the less off, making the cultural and social interaction more diverse.

The social sustainability is not easily quantified, but the side effect is a general gain in health for people that are naturally motivated to move around more, walk in the neighbourhood or bike along an inviting and pleasant route which can actually be long term measured in less healthcare costs.



Masterplan main elements

The masterplan consists of 4 main areas, connected by a recreational/ educational path: The Green Loop. The areas has different identities created by the mixture of the specific landscape and building characteristics.

Green loop

We have to think of a new definition of city and landscape as two opposites. With the knowledge of climate change, what we are forced do to minimize Co2, and the precautions that we have to take to minimize the consequences. It's a fact that, at different levels around the globe, we will have more, and more fiercefull rain, more and harsher winds. Storms and floods are getting more often. Some cities has allready had to take precautions and the results of different methods can now be studied. overflowing sewers, and poluted surfacewater, makes it neccessary to plan for delaying facilities in our cities, either as hidden construction, with delaying tanks, and seperating systems for rainwater and sewer water. We can also plan for open structures, that makes it possible to enjoy green and natural elements in the urban areas, and gives a hands on understanding of the rainwatercycle. The possibility to gain sensual and educational quality to everyday city life from a neccessity is a tempting option.

The main element that structures the masterplan and connects the different areas is the green loop. The loop is mainly a path, but it is also open rainwatercollectors, sometimes merging into open ponds with weed and grasses. The loop changes character according to the different characters of the areas that it runs trough. Along

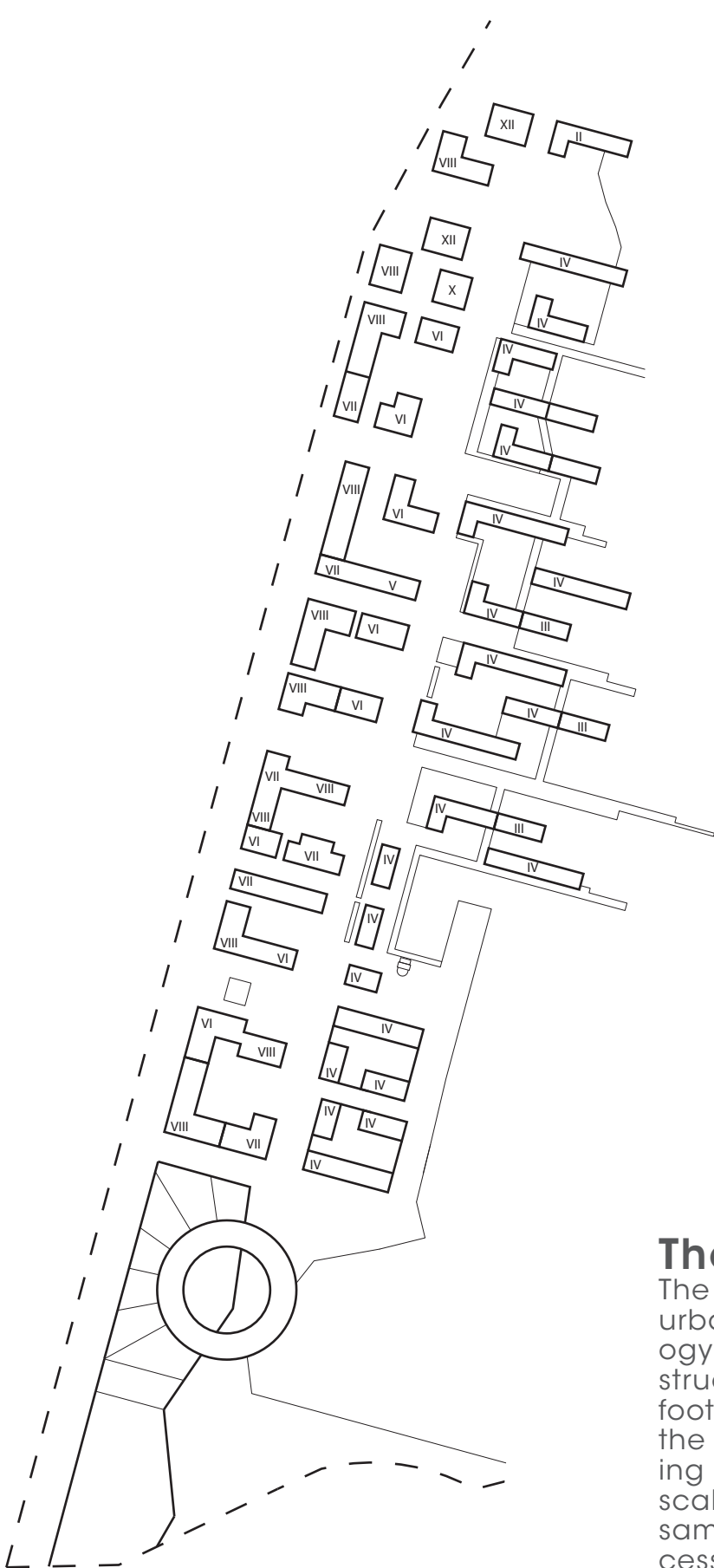
the loop small shelters offers the possibilities of gaining information of the natural phenomenons in the area, the biology of the special biotop etc, but also information on how your own body works, real time and theoretical. You are able to gather information real-time and upload it to the central database in the science center.

The loop runs through and connect the different areas around the waterfront, and gives the possibility for easy, fast and safe access to many areas connected to the loop. Hereby creating the most important starting point, for gaining a new culture of using the bicycle for transport.

The loop connects the new areas from the urban harbour setting, with permeable paving that opens up to larger scattered areas of green, with trees planted along the semiprivate courtyards towards the north, and the varied framed view of the waterfront towards the south.

The loop runs through the natural park across the mouth of the creek, with a paving of gravel, and sand, passing the beach area where wooden bridges and floating platforms gives access to the water for playing swimming and watersport. Passing the bridge at the smallboatclub, to the lake-island community. At the Lake-island community you can study the self-sustainable housing complex, standing in the surface water collecting ponds, connected by wooden bridges. Passing the waterfront and dense reedbed, with a large diversity of small animals, birds, frogs and insects.

The loop continues parallel to the new local road and pass through the Shorearea the small harbourlike fishing piers, and the backwaterharbour for small boats. Back through the tunnel and along the straight edged pier to the Science Center.



1.

- TOTAL BUILT AREA: 160 620 sqm
 INK SCIENCE CENTER 174 620 sqm

- TOTAL FOOTPRINT: 46 657 sqm

- TOTAL LAND AREA: 190 400 sqm

- AREA DENSITY = (TBA / TLA) x 100 = 91,7 %

- BLOCK DENSITY = (TBA / TF) x 100 = 374,2 %

The Harbour/Area 1

The Harbour is the densest and most urban area. A down scaled block typology continues the original city block structure. The downscaling of the block footprint creates a transition between the mainly motorized traffic at the existing plan to the bicycle and pedestrian scale and pace of the harbour, at the same time more transparency and accessibility is created. The block structure is porous and creates raised, inner, semiprivate courtyards, accessible to the waterfront path through wide steps. Parking is placed in construction, underneath the raised courtyards. The 5 m. edge of the parking floor towards the public areas is either used in connection with the first floors as duplex rentals, or as small workshops, offices, entrances for the apartments and, when feasible, as shops, cafes etc. By doing this, streets with no activity dominated by closed facades are avoided and safe, pleasant and lively streetscape between the blocks are ensured. Some of the streets perpendicular to the waterfront connects to the existing cityscape and transits into sloping jetties towards the water. The jetties are connected with small wooden bridges at a lower level than the the ground floor of the houses, hereby ensuring both public access to the water and defining private zones for the housing, without fences and other visual barriers

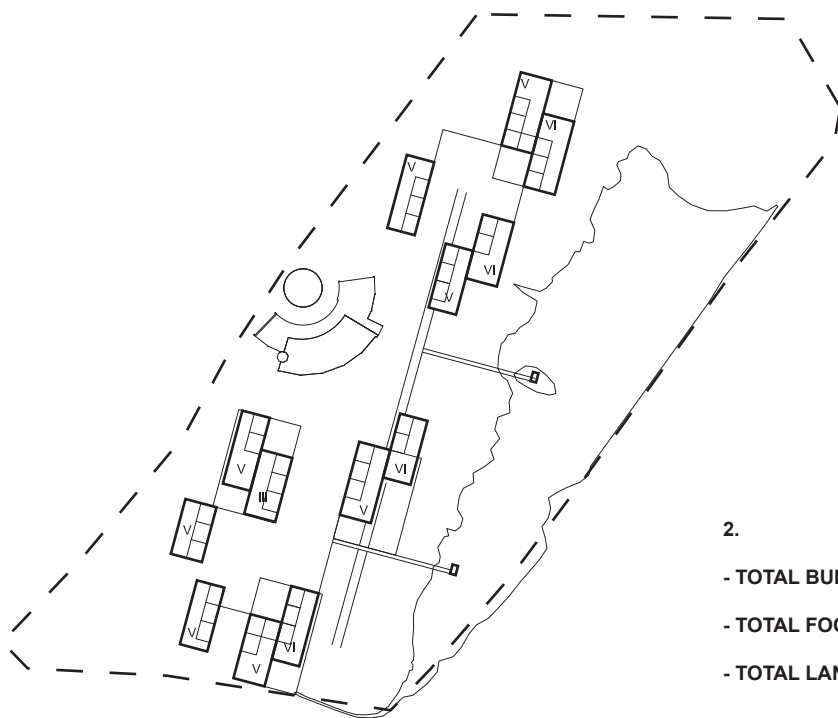
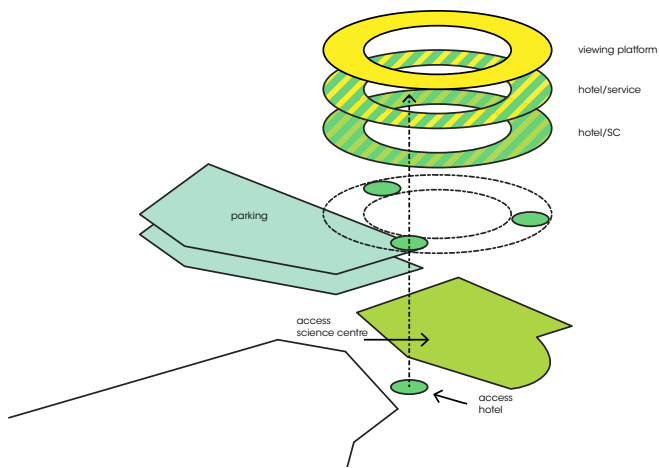
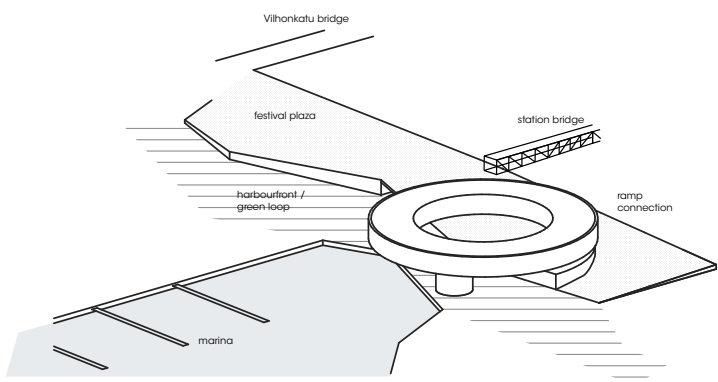
The waterfront path is the urbanized part of the green loop. The surface is partly permeable, and islands of greenery and groups of trees are placed where possible. A channel with different reeds end grasses collects the excess surface/rainwater. The path is a contemporary promenade for slow traffic, walking, jogging and biking. It is only crossed by permitted cars a few places, at a slow speed, secured by bumps and green obstacles.

Moving along the waterfront path, slips and wooden jetties, gives framed views of the lake.

The housing on the waterside of the path is placed perpendicular to the lakeshore, to ensure visual connection. The houses is clustered around a lightly raised inner surface that gives access to the appartments and row-houses, and creates a semiprivate space in connection with the entrances. Parking is placed under the deck, above water level.

Smaller floating bridges for canoes, kayaks and small boats gives direct access to the water.

Parking of cars in the area is predominately in construction. Short term parking and guest parking along the streets ensures accessibility without dominating the streetscape.



2.

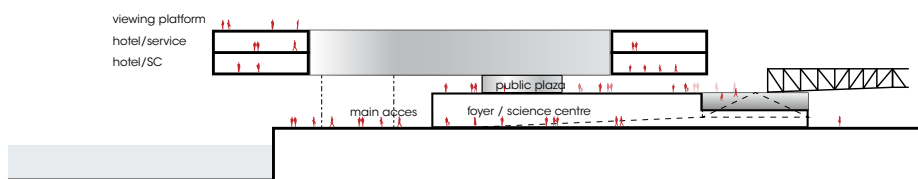
- TOTAL BUILT AREA: 33 565 sqm

- TOTAL FOOTPRINT: 7710 sqm

- TOTAL LAND AREA: 10 9700 sqm

- AREA DENSITY = (TBA / TLA) x 100 = 30,6 %

- BLOCK DENSITY = (TBA / TF) x 100 = 435 %



Festival Plaza/Science Center

The Harbour Area culminates with the Science Center and the Festival Plaza. The Festival Plaza is towards the north shaped as a sloping surface that connects different levels and gives natural access to the bridge crossing the railroad on one side, and the waterfront on the other. Towards the south it's a paved welcoming plaza, in connection with the large foyer of the Science center. Sometimes events can be happening at the plaza, other times the south sloping surface gives space for a gathering or just staying watching the harbour life.

The surface has multipurpose use, in daily use it's a waterfront park, with decentralized parking pockets, hard surfaces for skating, and other street-sports, and soft surfaces for relaxing and meeting. At festivals the area is inhabited by festival stands, stages etc. the surface is partly covering the exhibition spaces, and partly covering a two story parking house

If feasible. If this is not feasible this part of the plaza is constructed as earth work from building site excess dirt, with angled edges to avoid supporting walls.

The Science Center

We suggest that the Science Center program is combined with hotel/conference facilities and research offices. The exhibition spaces is situated in the large double high base. The regular geometry and pillar construction with large spanning slabs ensures flexible exhibition space with changeable circulation routes. Conference rooms and auditoriums is also placed in the base. The foyer that connects all activities spans along the open glassfacade towards the waterfront. We suggest that

the foyer is disposed as an indoor public space, with café, bookstore library etc.

On top of the base is the hub, a large floating circular building, expressing the democratic idea of connecting, developing and exchanging knowledge as an open source.

The cirkel houses, restaurant, hotel, meeting facilities and research offices, and maybe a viewplatform on the roof.

Wetland Park/Area 2

Wetland Park is an open citystructure centered around the former railroad building, and framed by a new forrest. The headline of the program is entrepreneurship, offering flexible economic space for offices, creative buisnesses, and smaller non-poluting production. We also suggest the possibility to create combined work/live spaces, for newly started small businesses. The building units are simple and build in an economical way, to keep the rental costs low. Each building can be added over time. The park setting is enhanced by the plantation of young trees that in time will grow and form a rich biotop for birds and other animals in connection with the wetlands.

The atmosphere is informal, the outer surfaces are mainly gravel, parking is on terrain.

The surrounding natural park and the protected wetlands are obvious qualities, and the nearby public transportation hub, gives a great business location.

3.

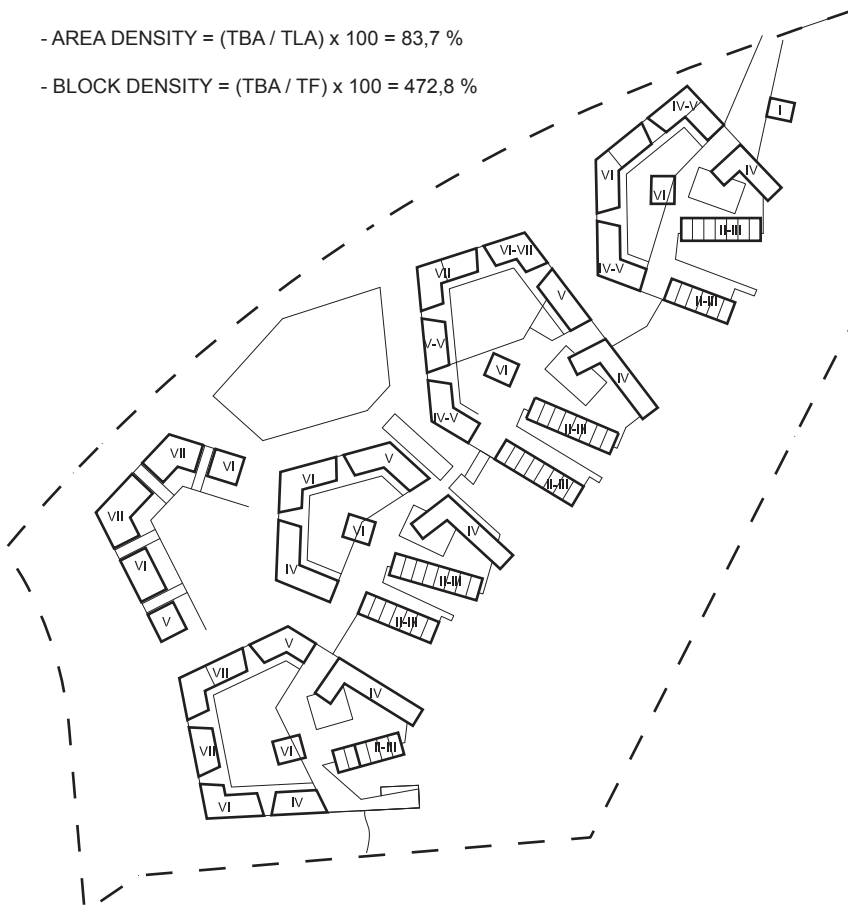
- TOTAL BUILT AREA: 75 175 sqm

- TOTAL FOOTPRINT: 15 897 sqm

- TOTAL LAND AREA: 89 850 sqm

- AREA DENSITY = (TBA / TLA) x 100 = 83,7 %

- BLOCK DENSITY = (TBA / TF) x 100 = 472,8 %



Mountain and shore vil- lage/Area 3

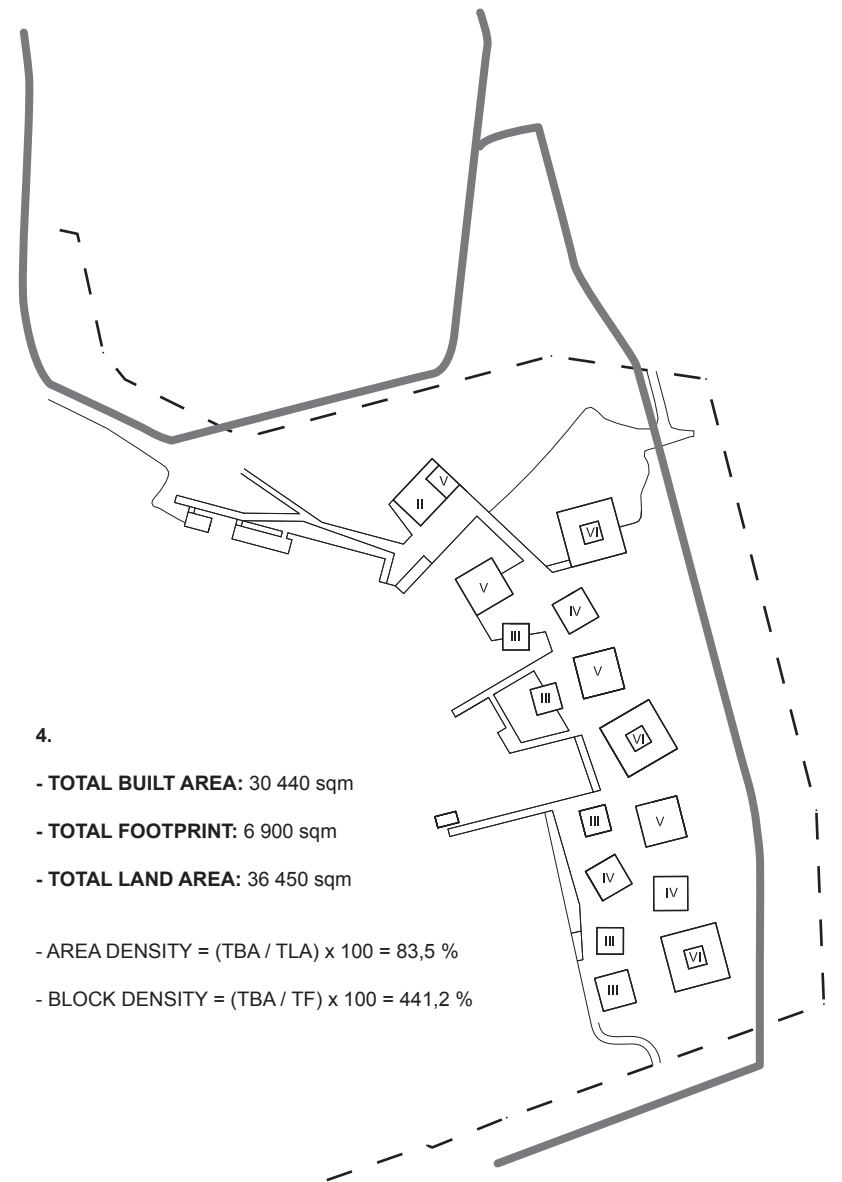
The organically shaped terraced housing blocks, forms wind and noise protected semiprivate courtyards towards the south-west. The apartments are all overlooking the intimate harbour area and the lake. There is direct access to the fringing waterfront, and the small protected areas between the wooden boardwalks. A canal is constructed to give water access to the lake that forms a natural protected area for small boats and kayaks.

The rowhouses and small apartments along the edge lives with direct access to the boat piers, peaceful living within 10 minutes walk along the shoreside, from the lively harbour area.

Lake island area/ Area 4

The lake island area, is composed of compact, freestanding apartment buildings, placed in the natural setting of the wetlands. The buildings are connected by boardwalks and wooden jetties, interwoven with ponds of delayed rainwater, and controlled reedbed. The reedbed is enhanced and supplied to create a unique natural setting for birds and animals. All excess rain and surfacewater is delayed and naturally cleaned in the interconnected ponds before being let into the lake in a controlled manner. The area is a living sustainable laboratory, and an open classroom for hands on learning. The buildings are energy neutral, highly insulated, and the construction is all-wood in different systems.

The roofs are sloping 30 degrees towards the south and clad with photovoltaic panels and conventional solar heating panels. The aim is that 1/5 of the floor area will be laid out on the roofs to be able to have enough photovoltaic and solarheating panels, to



4.

- TOTAL BUILT AREA: 30 440 sqm

- TOTAL FOOTPRINT: 6 900 sqm

- TOTAL LAND AREA: 36 450 sqm

- AREA DENSITY = (TBA / TLA) x 100 = 83,5 %

- BLOCK DENSITY = (TBA / TF) x 100 = 441,2 %

create a true co2 neutral and energy producing environment.

The rainwater from the roofs are collected to decentralized underground tanks, to facilitate grey water handling for toilet flushing and laundry.

The edge along the shore gives room for strolling and and sitting, boating, swimming and kayaking. The atmosphere is calm and recreational.

Cars are parked in the back of the area on terrain, where also the garbage sorting stations, and the loading stations for electrical cars are placed, under the roof of an extensive new larch plantation.

Sustainable planning

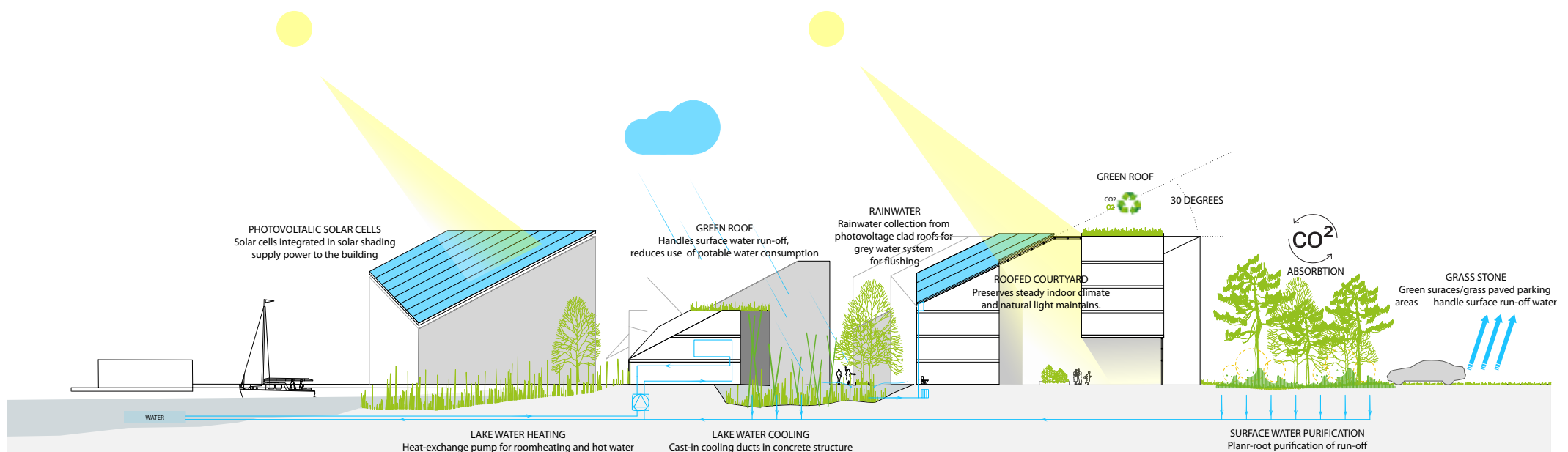
Creating new sustainable city areas has a number of scale levels from the macro to the micro scale. How large the scale can be depends on the feasibility and political will. Planning for an area the size of Satamalahti, that is part of an existing city fabric, there has to be an analysis on how the new planning can influence the old, how they can work in a symbiosis, to gain economic benefits, save resources and energy.

We suggest that the model for "Industrial Symbiosis" is used on a feasible level that by analysis is shown realistic, politically and financially.

The flows of the existing city and the new is analysed to understand where there is possible gain. How garbage can be sorted and reused, used as district heating fuel, or be biocomposted and make biogas. How cooling from one place can be heating in another. How the use of material makes reuse possible etc.

The functional infrastructure responds to this analysis.

The spatial structure should be influenced by the understanding of how we, by spatial and organisational structure can help to make the acts and flows of



people more sustainable, how it can support Co2 friendly transportation, less land use, more compact, higher quality living, how we can facilitate informal and fearless meetings between strangers. This means making a city scape that prioritises people upon the mere rational. The cityscape should support pedestrians and bicyclists by making an eventful cityscape that is protected from the wind, has short rhythms, made for slow speed, and short distances. It should support smaller living units, and less use of energy and resources, by making the neighbourhood qualities obvious as a living room. Decentralized collecting stations, and effective reuse should make sorting of garbage easy and natural.

The social sustainability should be further supported by a diversity of ownership possibilities

Large diversity in housing sizes, and functional solutions. Live/work housing for the small entrepreneur, studio size and large apartments etc..

Minimum 10-20 % of each plot should hold social housing, and there should be a mixture of rental, cooperation and privately owned

Traffic and connections

We suggest that all motorized traffic is mainly concentrated on the main roads in the back of the lakeside areas. An electrical shuttle bus serves the areas, with a short rhythm, and many stops. No one lives further away from a bus stop than 200 meters

Each area is fed from behind with parking spaces covered by semiprivate outdoor areas in connection with the housing.

Greenscape

To ensure open green areas large enough to support different species habitats and green lungs to mitigate greenhouse gas emissions, we suggest that developments are concentrated leaving green areas for recreational use.

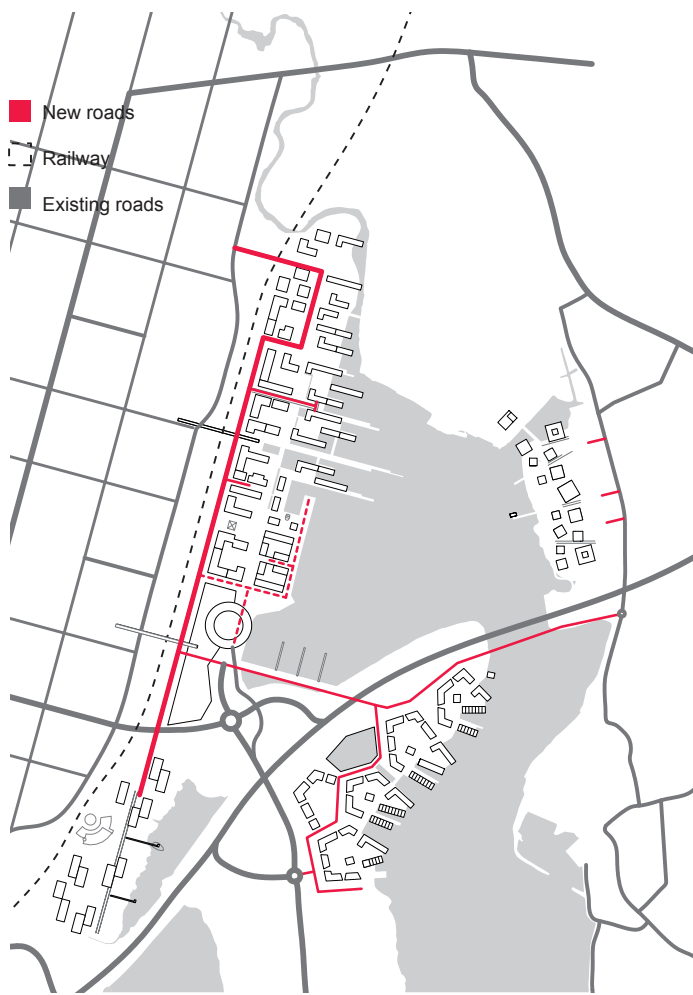
We suggest green roofs to prolong water drainage, where water collection and/or photovoltaic/solar heating is not needed. The green roofs, delay rainwater, and support different micro habitats, the cityscape is infused with green material, and all surfaces are sought to be as porous as possible.

Build structure

The new plan keeps the area of the lake intact, even though the edge changes.

Additional new structure in the lake should be placed on pillars to ensure the natural waterflow.

There should be priority to the use of wood from local producers in new construction, as massive wood elements, lightweight, woodbased, framing and in-fill systems, relatively short spans, and balance between the smallest footprint and smallest facade factor. Medium rise demands lesser resources than highrise, less construction, lower wind cooling, less elevator transportation.



traffic network



pedestrian and bicycle network

- Boat Traffic
- Steamers Parking dock
- Decentralized Boat Parking dock



jetties



parking

- Housing
- Services
- Business
- Nursery



programme

Heating and electricity usage

Outer surface of new buildings should be insulated to min U-value 0,08. Window openings are maximum 40 % of the façade area. All windows should be 3 layers, high insulated windows, to an U-value of 0,7 in coldbridge insulated frames. We suggest that the heating supplied from the district heating system is combined with geothermal heating, and decentralized water bound solar panels for domestic water, where the distance is too far. Polycrystalline photo voltage panels are used on optimal orientation.

Waste

Waste is sorted in decentralized waste stations with short distance to the users. Electrical waste cars transport the waste from the decentralized stations. Organic waste is decomposed for biogas in the lake island area. Reusable material is reused, and burnable material is burned, and excess heat is used in the district heating. A larger centralized area for sorting of larger items should be placed centrally in each area.

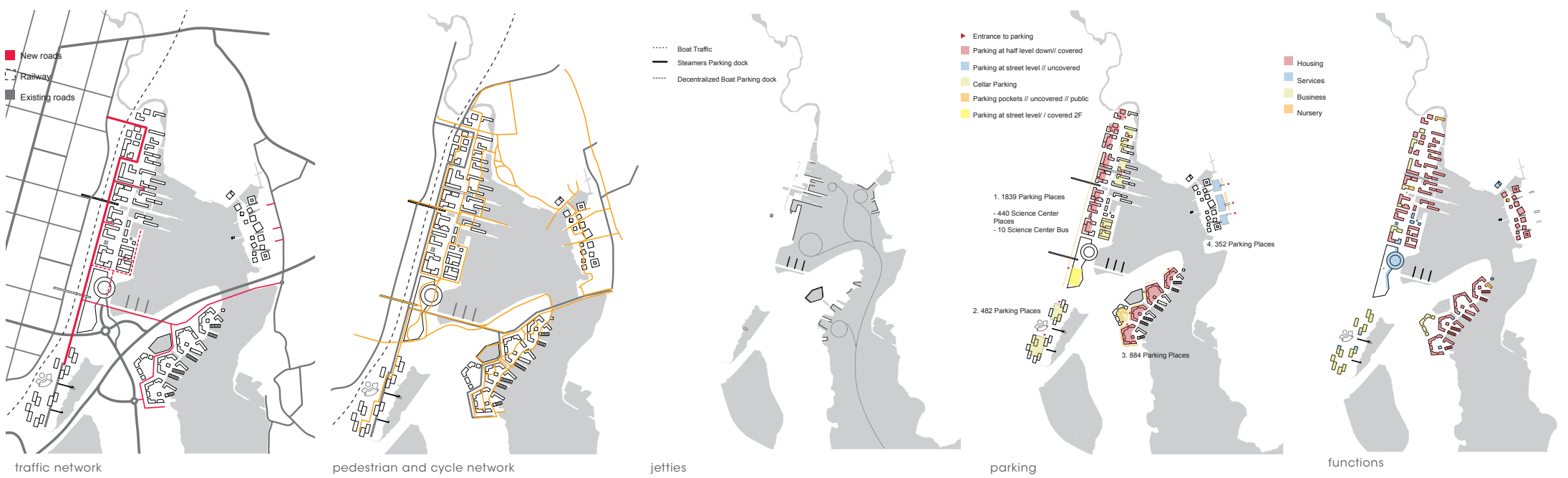
Rainwater

Rainwater is collected from roofs, and reused in water-closets, and decentralized grey water laundry mates. Most ground surfaces will be permeable, with open pavements and boardwalks. Excess rainwater runs in open channels to decentralized reed beds. Roofs that are not in use as terraces, for photovoltage panels, or as rainwatercollectors, will be covered with sedum to delay rainwater and improve microlife.



Satamalahti, Mikkeli

Architecture ideas competition for the area of Satamalahti, stage 1



Satamalahti, Mikkeli

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Traffic and connections

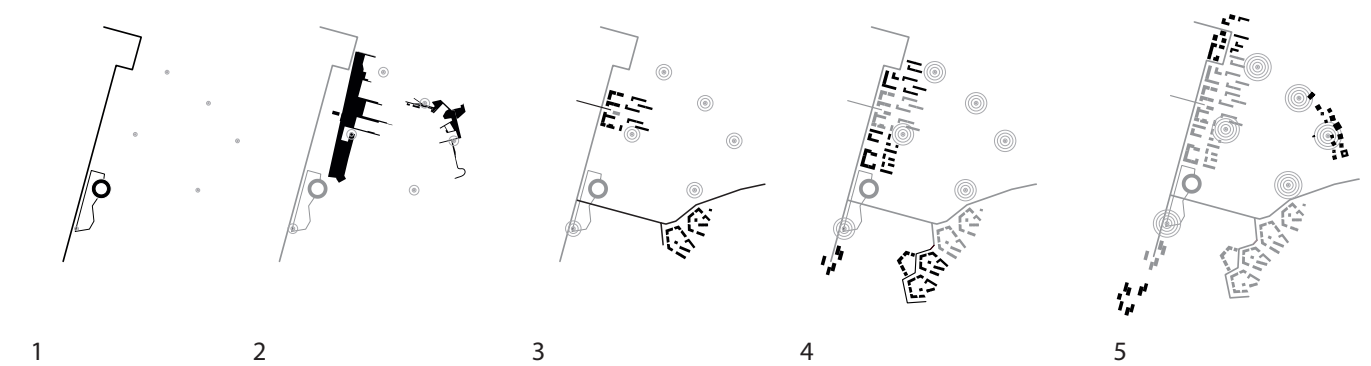
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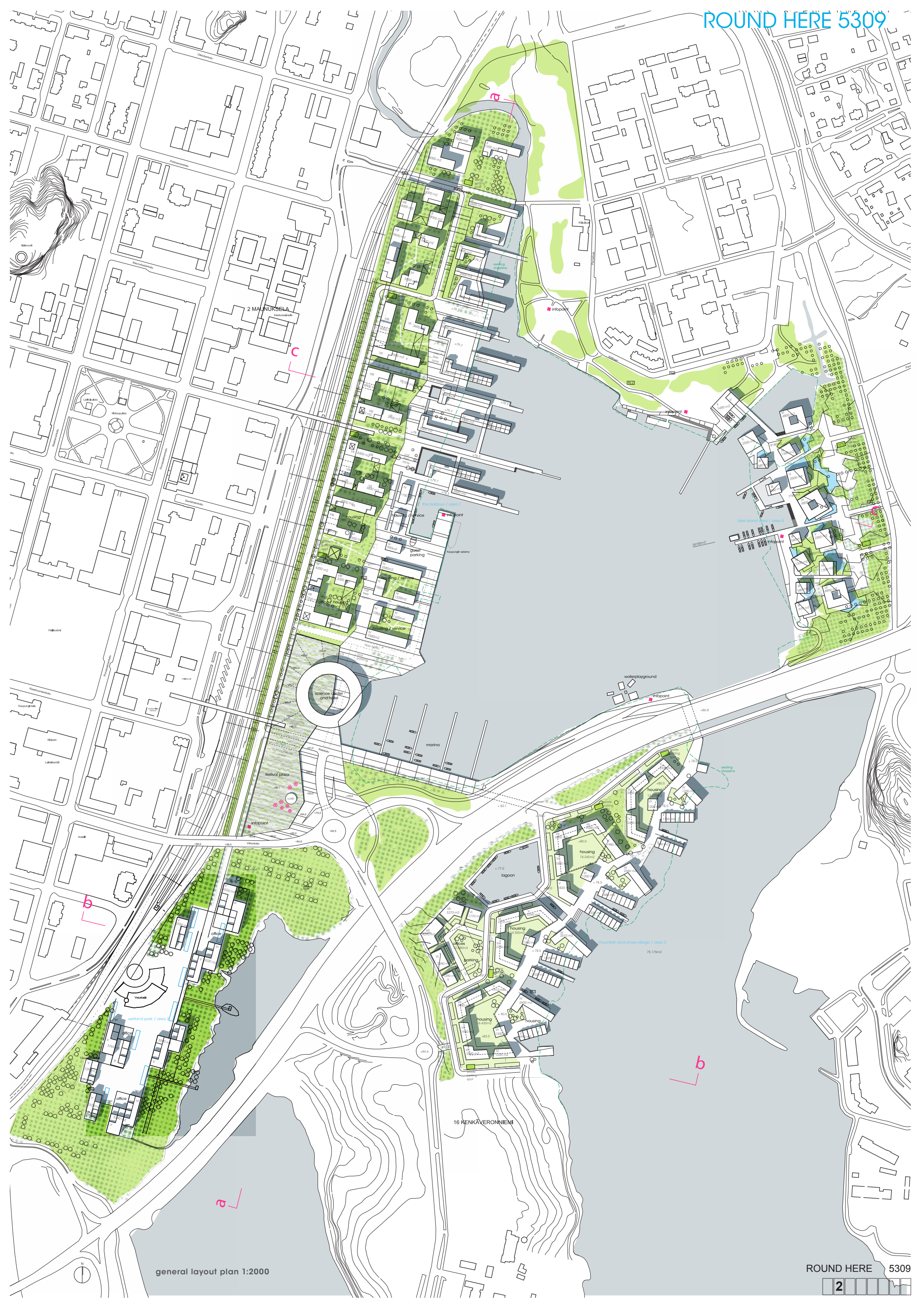
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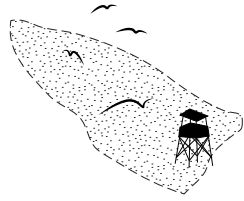
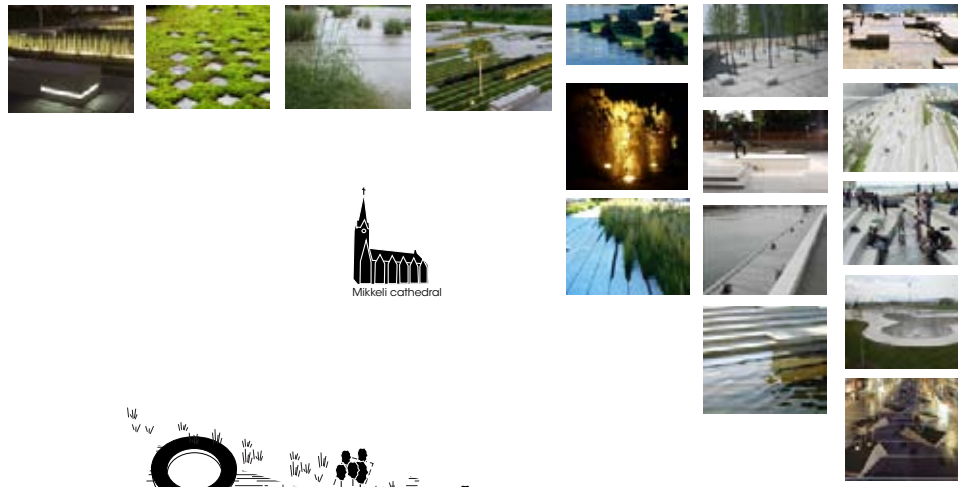
1 2 3 4 5
phases of implementation





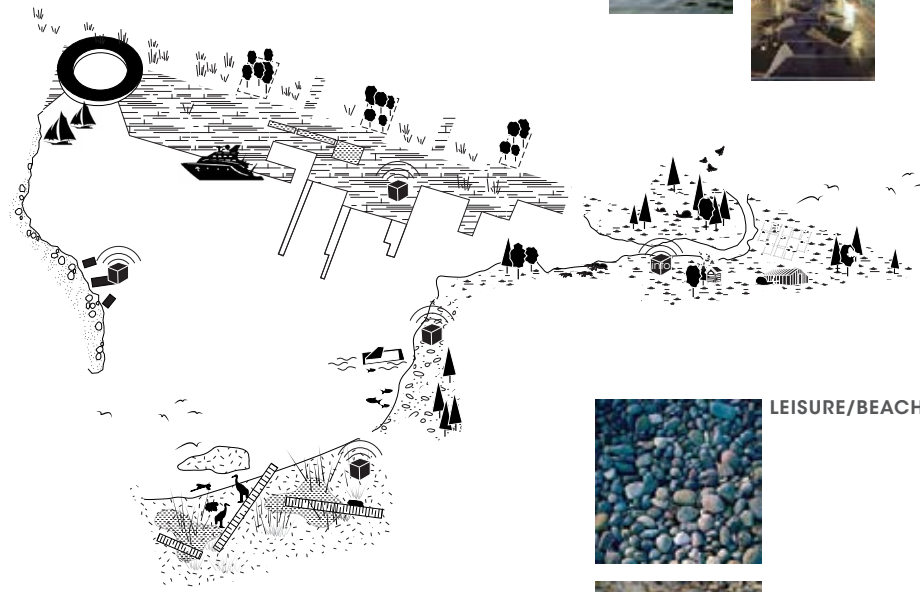
general layout plan 1:2000

URBAN LIVING

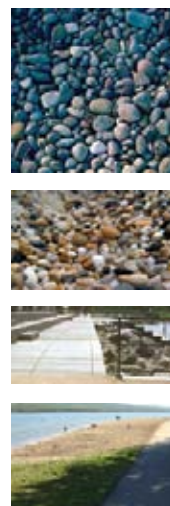


Mikkelin cathedral

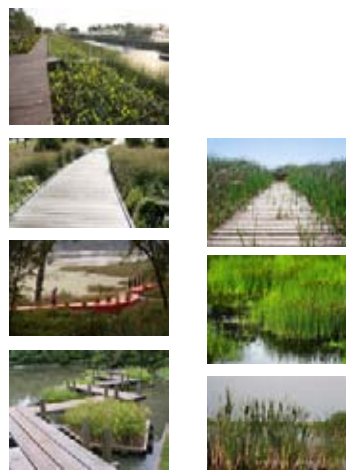
SPORTS ACTIVITY



LEISURE/BEACH



SWAMPY LIVING



NATURE INTERACTIONS



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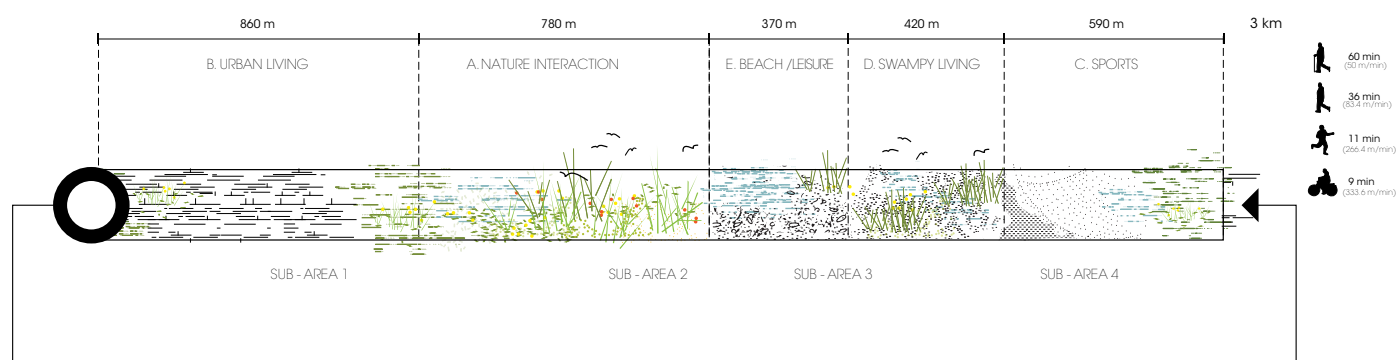
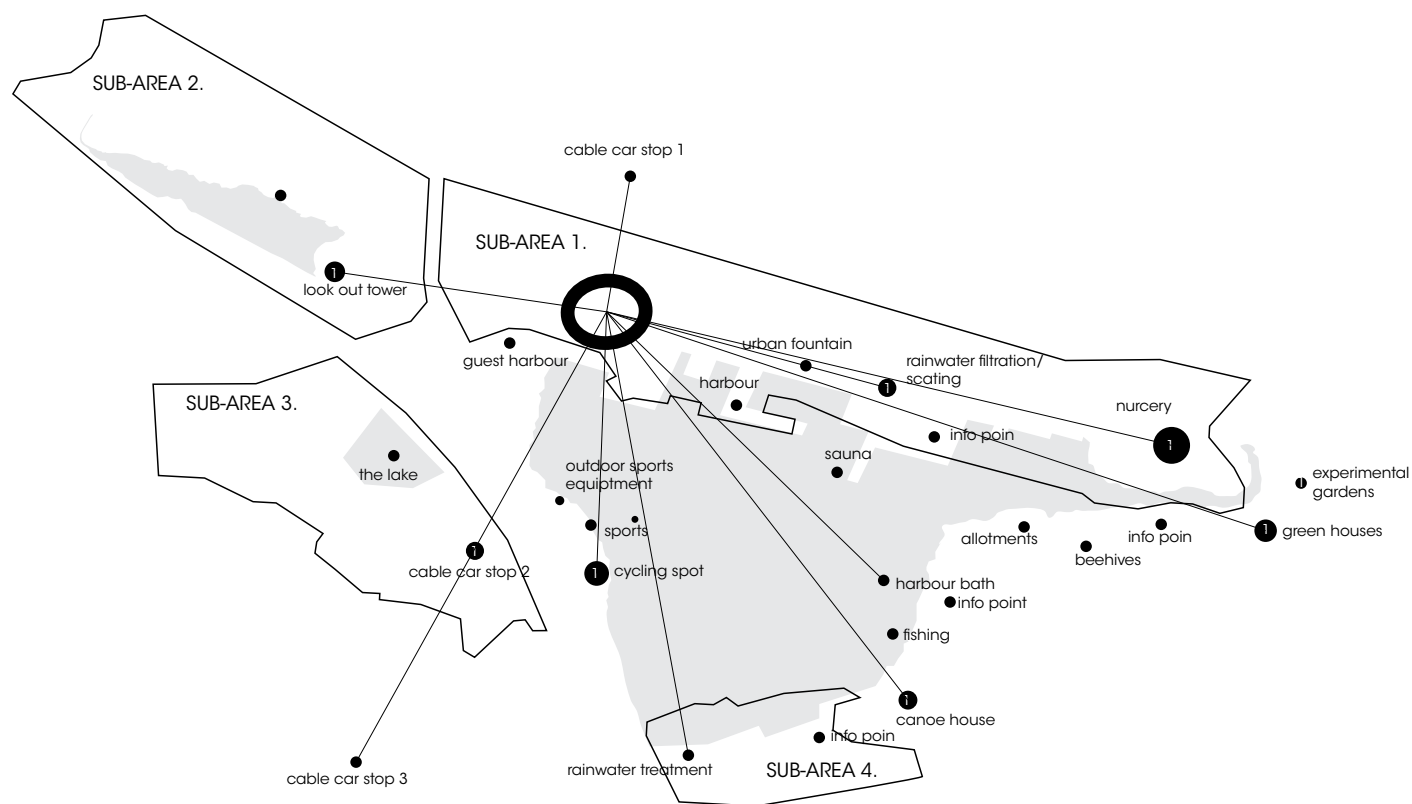
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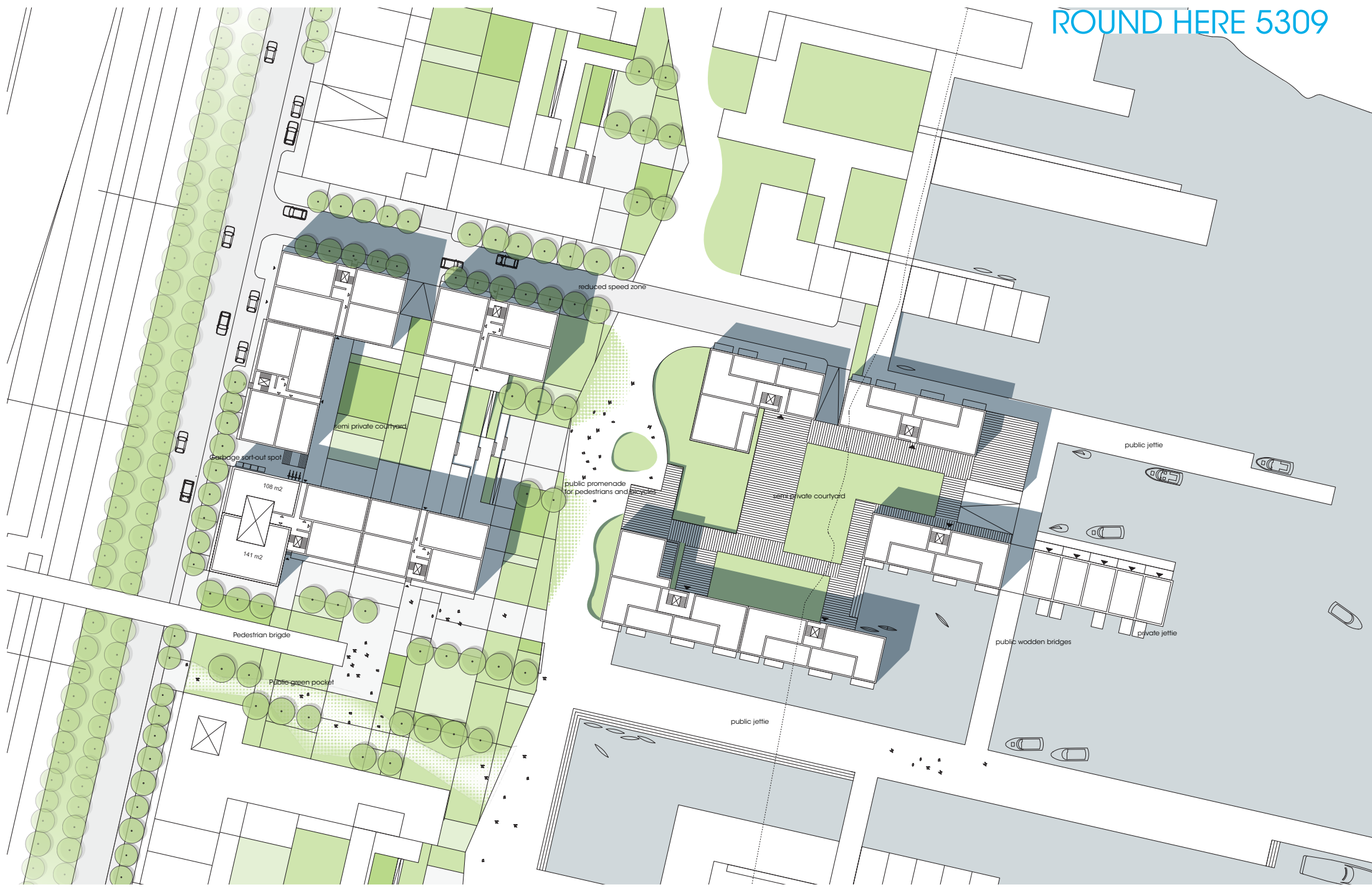
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GREEN LOOP

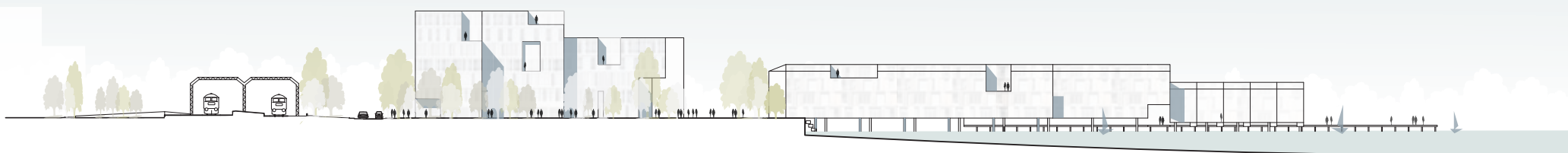
Green loop

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THE HARBOUR area 1



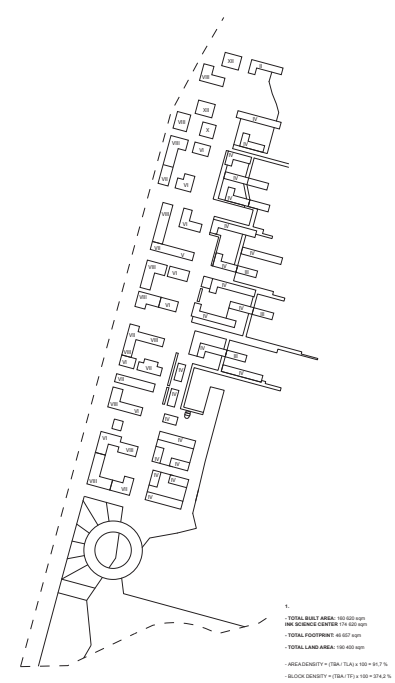
street elevation 1:500

The Harbour/Area 1



The Harbour is the densest and most urban area. A down scaled block typology continues the original city block structure. The downscaling of the block footprint creates a transition between the mainly motorized traffic at the existing plan to the bicycle and pedestrian scale and pace of the harbour, at the same time more transparency and accessibility is created. The block structure is porous and creates raised, inner, semi-private courtyards, accessible to the waterfront path through wide steps. Parking is placed in construction, underneath the raised courtyards. The 5 m. edge of the parking floor towards the public areas is either used in connection with the first floors as duplex rentals, or as small workshops, offices, entrances for the apartments and, when feasible, as shops, cafes etc. By doing this, streets with no activity dominated by closed facades are avoided and safe, pleasant and lively streetscape between the blocks are ensured. Some of the streets perpendicular to the waterfront connects to the existing cityscape and transits into sloping jetties towards the water. The jetties are connected with small wooden bridges at a lower level than the the ground floor of the houses, hereby ensuring both public access to the water and defining private zones for the housing, without fences and other visual barriers

The waterfront path is the urbanized part of the green loop. The surface is partly permeable, and islands of greenery and groups of trees are placed where possible. A channel with different reeds and grasses collects the excess surface/rainwater. The path is a contemporary promenade for slow traffic, walking, jogging and biking. It is only crossed by permitted cars a few places, at a slow speed, secured by bumps and green obstacles. Moving along the waterfront path, slips and wooden jetties, gives framed views of the lake. The housing on the waterside of the path is placed perpendicular to the lakeshore, to ensure visual connection. The houses is clustered around a lightly raised inner surface that gives access to the apartments and row-houses, and creates a semi-private space in connection with the entrances. Parking is placed under the deck, above water level. Smaller floating bridges for canoes, kayaks and small boats gives direct access to the water. Parking of cars in the area is predominately in construction. Short term parking and guest parking along the streets ensures accessibility without dominating the streetscape.



lakeside elevation 1:2000



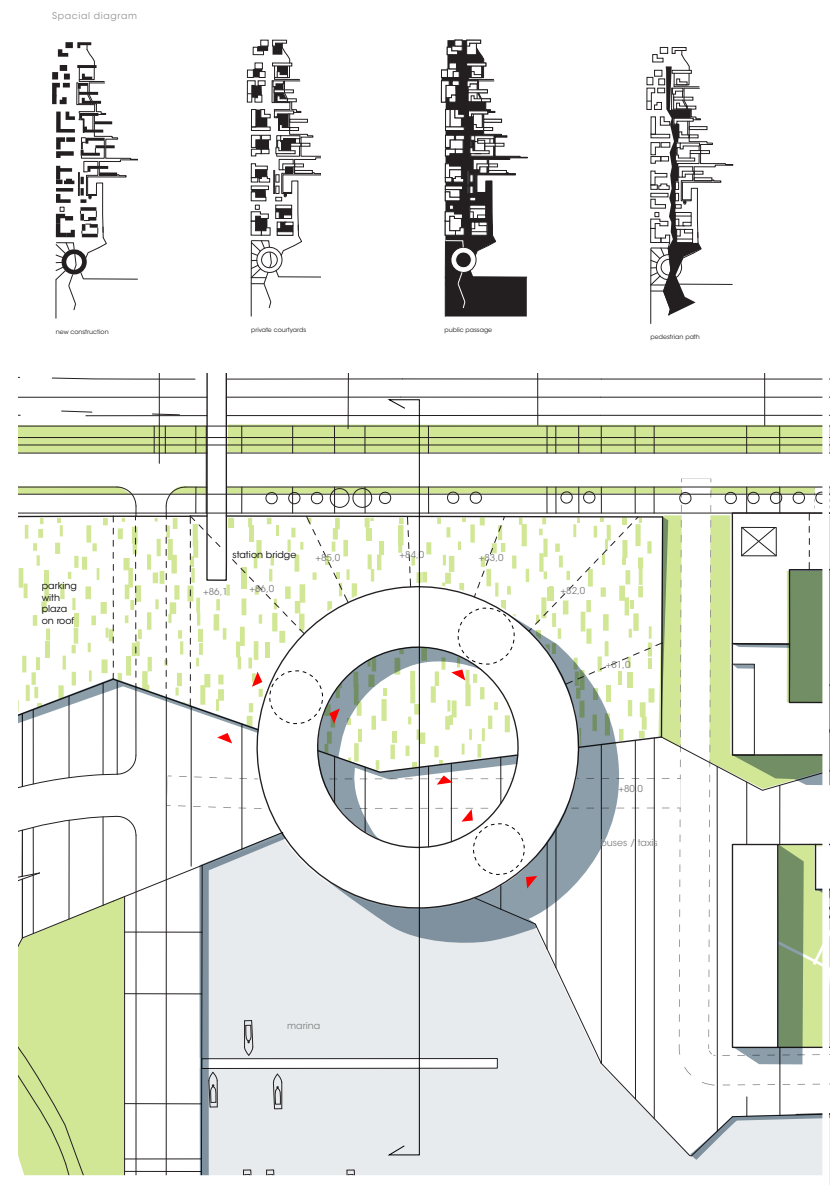
cityside elevation 1:2000

housing and offices

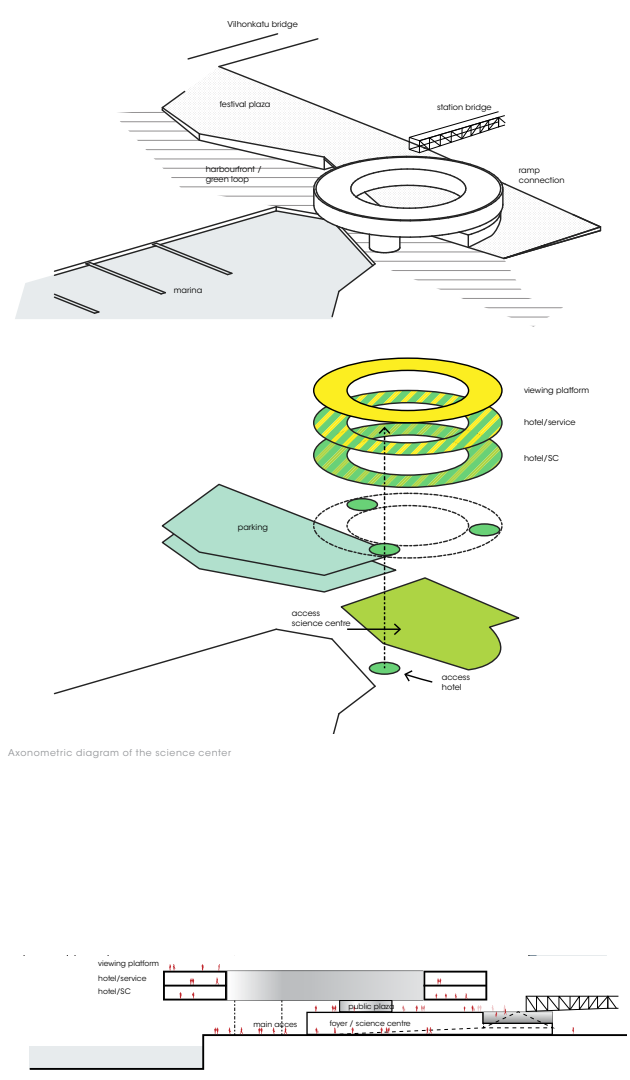
housing and offices

SCIENCE CENTER

festival plaza



science center plan 1:1000



science center section 1:1000

Festival Plaza/Science Center

The Harbour Area culminates with the Science Center and the Festival Plaza. The Festival Plaza is towards the north shaped as a sloping surface that connects different levels and gives natural access to the bridge crossing the railroad on one side, and the waterfront on the other. Towards the south it's a paved welcoming plaza, in connection with the large foyer of the Science center. Sometimes events can be happening at the plaza, other times the south sloping surface gives space for a gathering or just staying watching the harbour life. The surface has multipurpose use, in daily use it's a waterfront park, with decentralized parking pockets, hard surfaces for seating, and other streetsports, and soft surfaces for relaxing and meeting. At festivals the area is inhabited by festival stands, stages etc. the surface is partly covering the exhibition spaces, and partly covering a two story parking house. If feasible. If this is not feasible this part of the plaza is constructed as earth work from building site excess dirt, with angled edges to avoid supporting walls.

The Science Center

We suggest that the Science Center program is combined with hotel/conference facilities and research offices. The exhibition spaces is situated in the large double height base. The regular geometry and pillar construction with large spanning slabs ensures flexible exhibition space with changeable circulation routes. Conference rooms and auditoriums is also placed in the base. The foyer that connects all activities spans along the open glass-facade towards the waterfront. We suggest that the foyer is disposed as an indoor public space, with café, bookstore library etc. On top of the base is the hub, a large floating circular building, expressing the democratic idea of connecting, developing and exchanging knowledge as an open source. The cirkel houses, restaurant, hotel, meeting facilities and research offices, and maybe a viewplatform on the roof.

References



meeting between materials

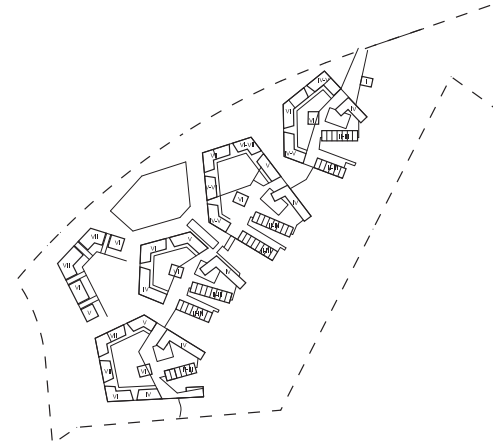


diversity in wooden facades



Mountain and shore vil-
lage/Area 3

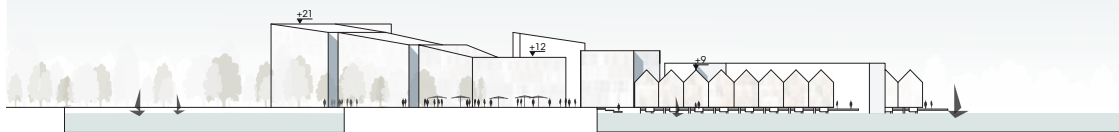
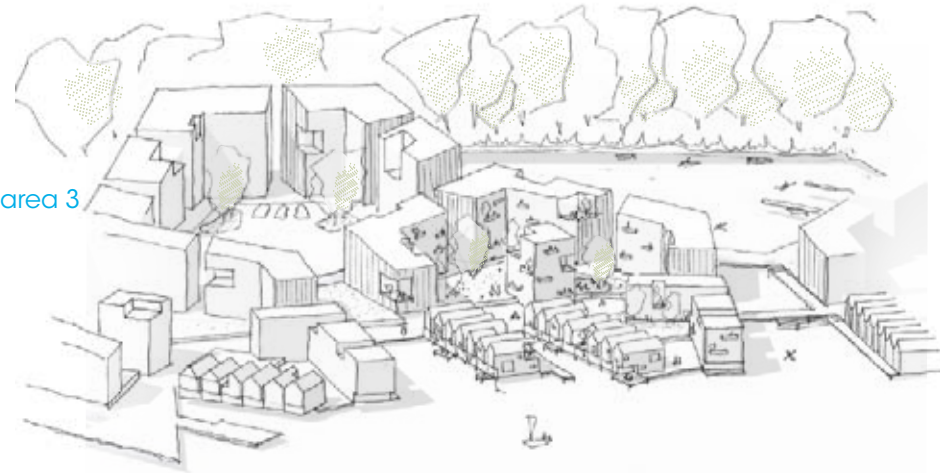
The organically shaped terraced housing blocks, forms wind and noise protected semiprivate courtyards towards the south-west. The apartments are all overlooking the intimate harbour area and the lake. There is direct access to the fringing waterfront, and the small protected areas between the wooden boardwalks. A canal is constructed to give water access to the lake that forms a natural protected area for small boats and kayaks. The rowhouses and small apartments along the edge lives with direct access to the boat piers, peaceful living within 10 minutes walk along the shoreside, from the lively harbour area.



3.
- TOTAL BUILT AREA: 75 175 sqm
- TOTAL FOOTPRINT: 18 907 sqm
- TOTAL LAND AREA: 69 992 sqm
- AREA DENSITY = (TBA / LA) x 100 = 83.7 %
- BLOCK DENSITY = (TBA / FA) x 100 = 472.9 %

Mountain and Shore village

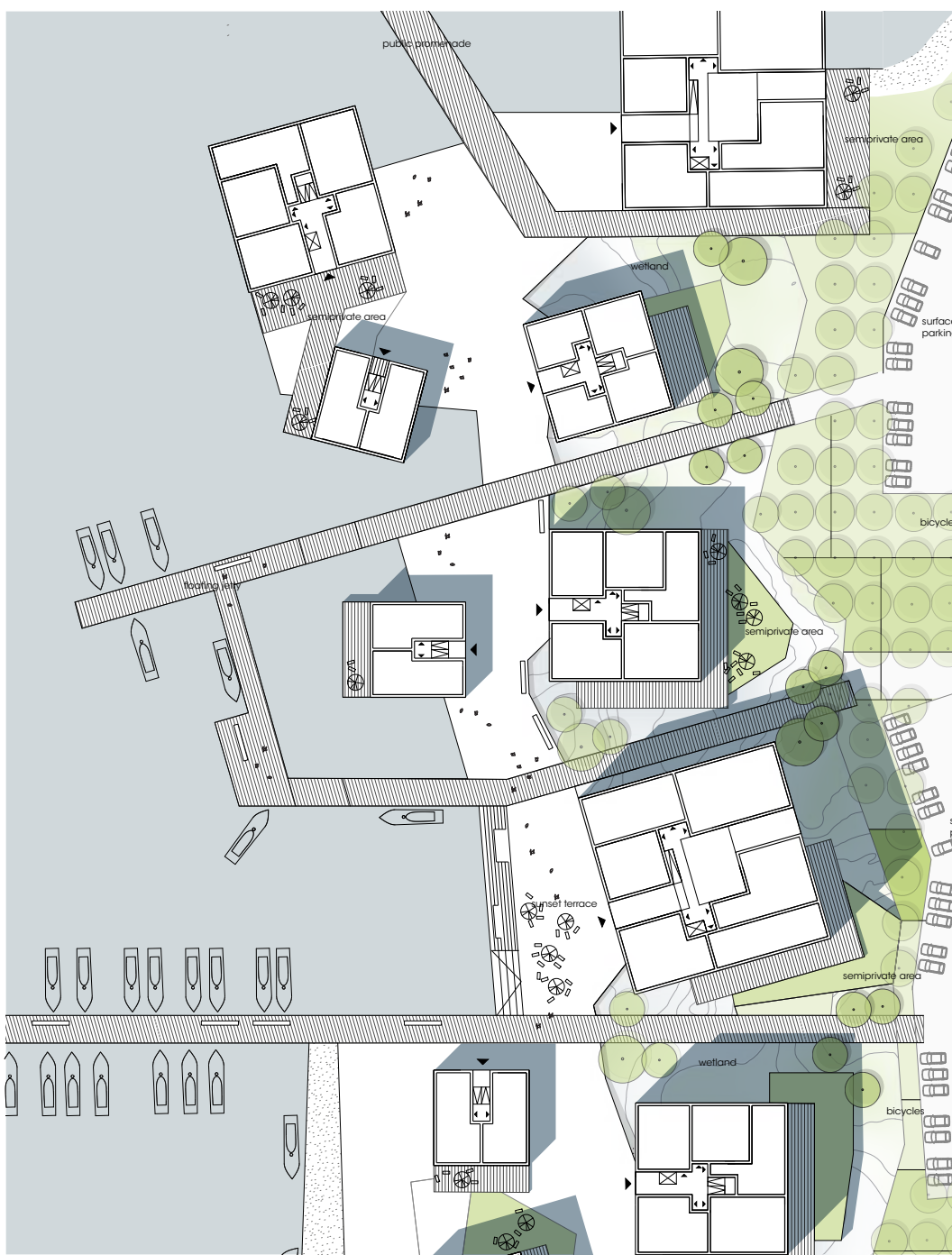
area 3



street elevation 1:500



section AA 1:2000



street elevation 1:500



Lake island area/ Area 4

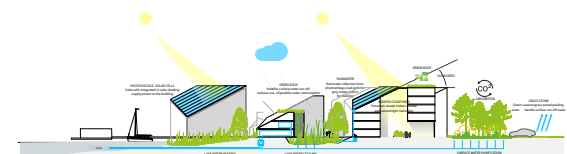
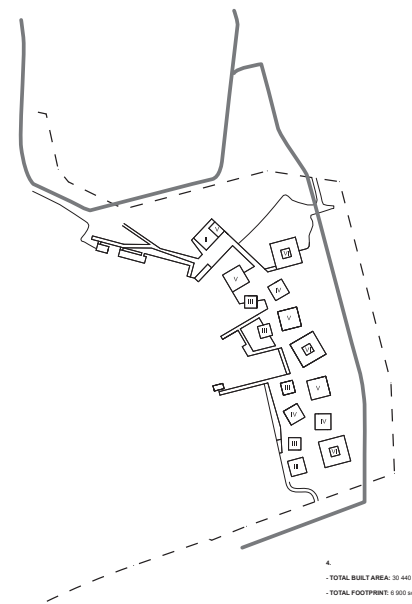
The lake island area, is composed of compact, freestanding apartment buildings, placed in the natural setting of the wetlands. The buildings are connected by boardwalks and wooden jetties, interwoven with ponds of delayed rainwater, and controlled reedbed. The reedbed is enhanced and supplied to create a unique natural setting for birds and animals. All excess rain and surfacewater is delayed and naturally cleaned in the interconnected ponds before being let into the lake in a controlled manner. The area is a living sustainable laboratory, and an open classroom for hands on learning. The buildings are energy neutral, highly insulated, and the construction is all-wood in different systems.

The roofs are sloping 30 degrees towards the south and clad with photovoltaic panels and conventional solar heating panels. The aim is that 1/5 of the floor area will be laid out on the roofs to be able to have enough photovoltaic and solarheating panels, to create a true CO2 neutral and energy producing environment.

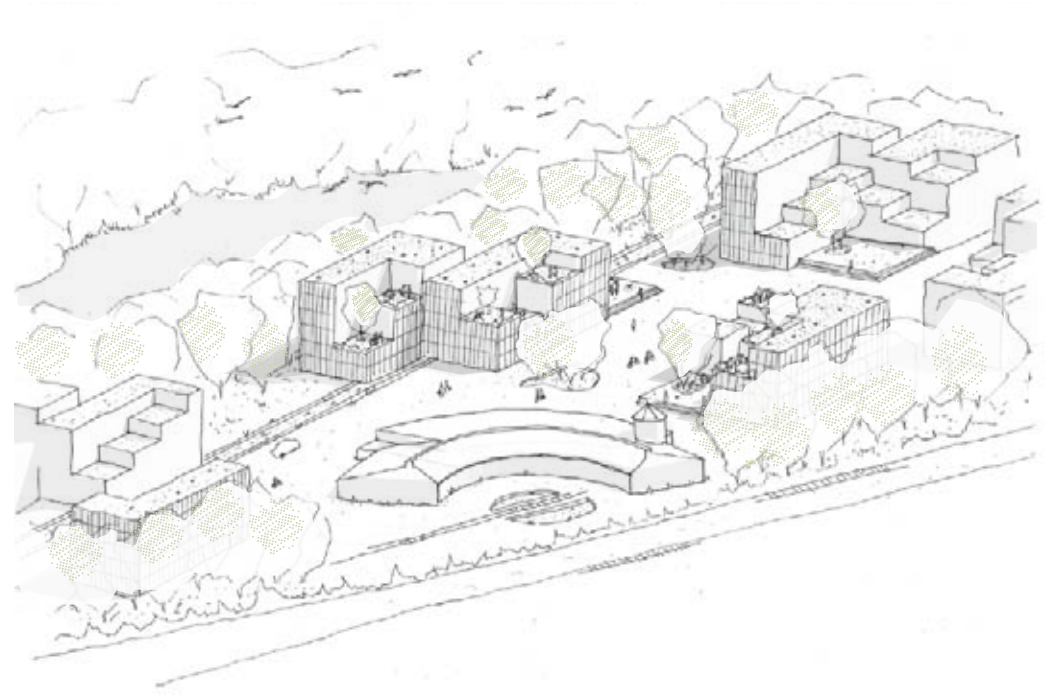
The rainwater from the roofs are collected to decentralized underground tanks, to facilitate grey water handling for toilet flushing and laundry.

The edge along the shore gives room for strolling and sitting, boating, swimming and kayaking. The atmosphere is calm and recreational.

Cars are parked in the back of the area on terrain, where also the garbage sorting stations, and the loading stations for electrical cars are placed, under the roof of an extensive new larch plantation.

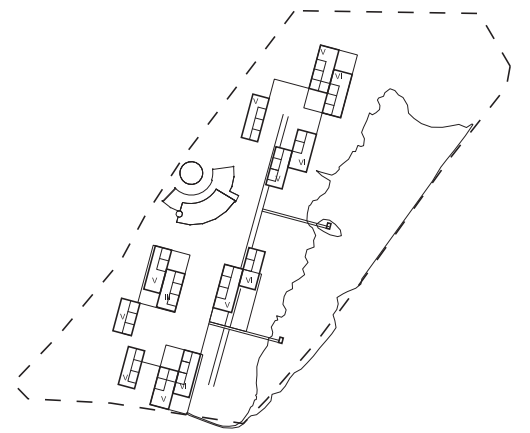


section CC 1:2000



Wetland Park/Area 2

Wetland Park is an open citystructure centered around the former railroad building, and framed by a new forest. The headline of the program is entrepreneurship, offering flexible economic space for offices, creative businesses, and smaller non-polluting production. We also suggest the possibility to create combined work/live spaces, for newly started small businesses. The building units are simple and build in an economical way, to keep the rental costs low. Each building can be added over time. The park setting is enhanced by the plantation of young trees that in time will grow and form a rich biotop for birds and other animals in connection with the wetlands. The atmosphere is informal, the outer surfaces are mainly gravel, parking is on terrain. The surrounding natural park and the protected wetlands are obvious qualities, and the nearby public transportation hub, gives a great business location.



- 2.
- TOTAL BUILT AREA: 33 955 sqm
- TOTAL FOOTPRINT: 7710 sqm
- TOTAL LAND AREA: 10 9700 sqm
- AREA DENSITY = (TBA / TLA) x 100 = 30,6 %
- BLOCK DENSITY = (TBA / TF) x 100 = 435 %



street elevation 1:500

Build structure

The new plan keeps the area of the lake intact, even though the edge changes. Additional new structure in the lake should be placed on pillars to ensure the natural waterflow. There should be priority to the use of wood from local producers in new construction, as massive wood elements, lightweight, woodbased, framing and in-fill systems, relatively short spans, and balance between the smallest footprint and smallest façade factor. Medium rise demands lesser resources than highrise, less construction, lower wind cooling, less elevator transportation.

Heating and electricity usage

Outer surface of new buildings should be insulated to min U-value 0,08. Window openings are maximum 40 % of the façade area. All windows should be 3 layers, high insulated windows, to an U-value of 0,7 in coldbridge insulated frames. We suggest that the heating supplied from the district heating system is combined with geothermal heating, and decentralized water bound solar panels for domestic water, where the distance is too far. Polycrystalline photo voltage panels are used on optimal orientation.

Waste

Waste is sorted in decentralized waste stations with short distance to the users. Electrical waste cars transport the waste from the decentralized stations. Organic waste is decomposed for biogas in the lake island area. Reusable material is reused, and burnable material is burned, and excess heat is used in the district heating. A larger centralized area for sorting of larger items should be placed centrally in each area.

Rainwater

Rainwater is collected from roofs, and reused in water-closets, and decentralized grey water laundry mates. Most ground surfaces will be permeable, with open pavements and boardwalks. Excess rainwater runs in open channels to decentralized reed beds. Roofs that are not in use as terraces, for photovoltage panels, or as rainwatercollectors, will be covered with sedum to delay rainwater and improve microlife.



section BB 1:2000